TABLE 6: MONTHLY

(in millions of kilowatthours)

ITEM	MONTH						
	JAN	FEB	MAR	APR	MAY	JUN	JUL
ENERGY USED BY SWP PUMPING AND POWER PLANTS							
Hyatt-Thermalito Pumpback and Station Service	0.51	0.47	0.53	24.10	0.56	0.26	5.30
North Bay Interim Pumping Plant	0.38	0.21	0.07	0.12	0.15	0.16	0.16
South Bay Pumping Plant	8.33	9.16	12.17	12.30	12.92	13.54	14.73
Del Valle Pumping Plant	0.01	0.10	0.25	0.21	0.15	0.01	0.01
Harvey O. Banks Delta Pumping Plant	28.16	60.61	64.27	56.88	55.11	58.41	55.44
San Luis Pumping-Generating Plant (SWP Share)	1.06	0.31	1.22	3.86	0.14	0.18	7.66
Dos Amigos Pumping Plant (SWP Share)	12.95	25.21	26.28	26.35	30.38	41.96	49.15
Buena Vista Pumping Plant	18.59	23.55	25.88	23.37	23.49	28.67	31.23
Wheeler Ridge Pumping Plant	21.10	24.46	24.82	24.72	23.43	25.85	28.24
Chrisman Wind Gap Pumping Plant	47.11	55.04	54.42	52.89	49.03	53.96	58.97
A. D. Edmonston Pumping Plant	167.24	194.87	190.94	183.40	169.06	186.09	201.35
Pearblossom Pumping Plant	0.57	8.14	18.15	28.46	33.88	34.71	34.05
Devil Canyon Powerplant (Station Service)	0.10	0.02	0.00	0.00	0.00	0.00	0.00
Oso Pumping Plant	20.46	19.92	15.06	13.52	9.08	10.42	8.58
William E. Warne Powerplant (Station Service)	0.03	0.02	0.06	0.05	0.05	0.03	0.02
Las Perillas Pumping Plant (SWP Share)	0.30	0.56	0.62	1.02	1.43	1.72	1.98
Badger Hill Pumping Plant	0.95	1.45	1.59	2.77	3.96	4.66	5.25
Subtotal	327.85	424.10	436.33	454.02	412.82	460.63	502.12
System Losses and Unaccounted for Energy	15.45	12.97	16.69	17.07	6.58	0.87	5.29
Total	343.30	437.07	453.02	471.09	419.40	461.50	507.41
SWP ENERGY SOURCES							
Hyatt-Thermalito Powerplants	81.48	98.75	93.45	123.00	285.39	285.71	264.98
San Luis Pumping-Generating Plant (SWP Share)	0.00	-.01	-.01	6.41	16.97	35.51	44.45
Devil Canyon Powerplant	2.59	7.84	24.22	47.67	60.96	56.63	65.42
William E. Warne Powerplant	41.47	40.73	30.84	27.87	19.19	20.68	18.69
Castaic Powerplant (SWP Share)	65.95	66.96	49.72	41.71	30.62	31.44	29.71
Bottle Rock Powerplant	-.21	0.55	9.84	22.37	23.32	-.18	-.39
Reid Gardner Unit No. 4	156.04	157.30	128.99	150.03	170.97	160.56	169.30
Pine Flat Powerplant	-.07	14.06	25.35	25.96	51.51	111.70	92.08
TERA Power Corporation	-.01	0.29	0.92	1.31	2.15	1.63	1.92
MWDSC Hydroelectric Plants (Exchange Energy)	7.00	5.13	12.81	18.74	19.64	18.71	17.81
Power Exchange Delivered to SCE	-42.14	-49.47	-67.28	-121.09	-195.35	-186.73	-181.78
Power Exchange Received from SCE	197.59	234.53	283.20	229.26	183.48	192.08	194.87
Energy Exchange Pacific Gas and Electric Company	0.00	0.00	0.00	0.00	4.00	0.00	0.00
Energy Exchange Southern California Edison Company	0.00	0.00	0.00	0.00	0.00	0.00	-8.63
Energy Exchange Salt River Project	0.00	0.00	0.00	0.00	0.00	-1.28	-7.20
SCE-SBVMWD Exchange	0.00	0.00	0.00	0.00	-.10	-.14	-.16
USBR 1982 Exchange Return	0.00	2.30	4.90	0.57	3.45	0.00	0.00
USBR Schedule Excess	0.31	0.10	0.33	0.08	0.12	0.04	0.00
LADWP Delivery Due to East Branch Outage	0.00	0.00	-4.02	0.00	0.00	0.00	0.00
Purchases							
British Columbia Hydro Power Authority	0.00	0.00	5.54	0.00	3.17	15.15	44.21
Bonneville Power Authority	27.90	54.95	3.15	0.00	203.97	51.84	0.00
Idaho Power Company	0.00	0.00	0.00	0.00	0.00	1.86	0.00
Montana Power Company	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Portland General Electric Company	74.40	67.20	74.40	70.88	0.00	111.00	120.33
Pacific Power and Light Company	116.18	78.98	112.09	141.95	9.14	22.19	2.72
Seattle City Light	0.00	0.00	0.00	0.00	0.00	1.26	0.18
Salt River Project	0.00	0.00	5.64	0.00	0.00	0.00	0.00
Washington Water Power Company	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Subtotal	728.48	780.19	794.08	786.72	892.60	929.66	868.51
Less Sales	385.18	343.12	341.06	315.63	473.20	468.16	361.10
Total	343.30	437.07	453.02	471.09	419.40	461.50	507.41

used by SWP plants in PGandE's service area, compared with 2.73 billion kWh used in SCE's service area.

Under various water conveyance contracts and exchange agreements (described earlier in this chapter), some CVP water is pumped through SWP facilities at Banks Delta, Dos Amigos, San Luis, and Las Perillas pumping plants. The USBR furnishes the energy for this use of SWP pumping

POWER OPERATIONS IN 1985

(in millions of kilowatthours)

MONTH						ITEM
AUG	SEP	OCT	NOV	DEC	TOTAL	
						ENERGY USED BY SWP PUMPING AND POWER PLANTS
11.11	6.46	3.87	4.80	7.12	65.09	Hyatt-Thermalito Pumpback and Station Service
0.16	0.16	0.15	0.20	0.34	2.26	North Bay Interim Pumping Plant
12.74	8.18	10.75	3.98	4.36	123.16	South Bay Pumping Plant
0.00	0.01	0.01	0.01	0.01	0.78	Del Valle Pumping Plant
63.21	74.72	59.71	57.45	99.68	733.65	Harvey O. Banks Delta Pumping Plant
9.28	20.04	14.89	18.41	65.84	142.89	San Luis Pumping-Generating Plant (SWP Share)
41.40	23.04	18.34	17.52	17.64	330.22	Dos Amigos Pumping Plant (SWP Share)
30.15	26.19	22.91	21.80	17.27	293.10	Buena Vista Pumping Plant
28.73	29.37	26.16	25.08	19.80	301.76	Wheeler Ridge Pumping Plant
61.71	65.15	57.13	55.62	43.03	654.06	Chrisman Wind Gap Pumping Plant
213.64	229.21	200.08	196.53	150.35	2,282.76	A. D. Edmonston Pumping Plant
37.65	32.83	19.52	20.91	12.02	280.89	Pearblossom Pumping Plant
0.00	0.00	0.00	0.00	0.00	0.12	Devil Canyon Powerplant (Station Service)
8.66	13.02	15.42	15.00	13.27	162.41	Oso Pumping Plant
0.03	0.01	0.00	0.02	0.00	0.32	William E. Warne Powerplant (Station Service)
1.10	0.42	0.37	0.17	0.30	9.99	Las Perillas Pumping Plant (SWP Share)
2.99	1.08	0.97	0.49	0.75	26.91	Badger Hill Pumping Plant
522.56	529.89	450.28	437.99	451.78	5,410.37	Subtotal
8.88	3.40	3.70	9.37	10.11	110.38	System Losses and Unaccounted for Energy
531.44	533.29	453.98	447.36	461.89	5,520.75	Total
						SWP ENERGY SOURCES
190.87	71.53	104.62	75.68	40.33	1,715.79	Hyatt-Thermalito Powerplants
18.44	0.38	0.12	0.80	0.00	123.06	San Luis Pumping-Generating Plant (SWP Share)
64.46	50.46	37.26	35.88	24.78	478.17	Devil Canyon Powerplant
17.46	27.39	33.27	31.58	30.49	339.66	William E. Warne Powerplant
31.37	50.76	66.01	56.45	49.91	570.61	Castaic Powerplant (SWP Share)
33.34	22.03	29.83	30.91	28.17	199.58	Bottle Rock Powerplant
166.62	158.70	104.09	121.67	165.87	1,810.14	Reid Gardner Unit No. 4
20.98	-.20	-.07	0.00	0.00	341.30	Pine Flat Powerplant
1.94	1.39	0.91	0.11	0.01	12.57	TERA Power Corporation
17.33	16.68	16.77	15.65	10.32	176.59	MWDSC Hydroelectric Plants (Exchange Energy)
-166.44	-100.65	-90.20	-75.30	-54.79	-1,331.22	Power Exchange Delivered to SCE
305.18	246.28	236.33	214.67	216.53	2,734.00	Power Exchange Received from SCE
0.00	0.00	36.70	37.00	39.40	117.10	Energy Exchange Pacific Gas and Electric Company
0.00	-2.87	5.51	12.03	9.49	15.53	Energy Exchange Southern California Edison Company
-4.20	0.00	29.79	0.00	0.00	17.11	Energy Exchange Salt River Project
-.15	-.15	-.19	-.15	-.13	-1.17	SCE-SBVMWD Exchange
1.29	0.35	0.00	0.00	0.00	12.86	USBR 1982 Exchange Return
0.04	0.04	0.00	0.00	0.00	1.06	USBR Schedule Excess
0.00	0.00	0.00	0.00	0.00	-4.02	LADWP Delivery Due to East Branch Outage
						Purchases
10.25	0.00	0.00	0.00	1.95	80.27	British Columbia Hydro Power Authority
0.00	0.00	3.86	145.52	16.90	508.09	Bonneville Power Authority
2.85	2.30	0.00	0.00	0.00	7.01	Idaho Power Company
1.22	0.30	0.00	0.00	2.05	3.57	Montana Power Company
175.54	180.95	16.38	6.23	7.40	904.71	Portland General Electric Company
11.33	21.53	83.38	6.52	0.00	606.01	Pacific Power and Light Company
0.00	0.00	2.10	0.00	0.00	3.54	Seattle City Light
0.00	0.00	4.99	4.84	0.00	15.47	Salt River Project
0.00	0.00	0.00	0.00	0.65	0.65	Washington Water Power Company
899.72	747.20	721.46	720.09	589.33	9,458.04	Subtotal
368.28	213.91	267.48	272.73	127.44	3,937.29	Less Sales
531.44	533.29	453.98	447.36	461.89	5,520.75	Total

facilities. Table 6A summarizes the total amount of energy used for pumping at each plant, the energy furnished by the USBR, and the derivation of the net SWP energy use presented in Table 6. (The quantities shown as "excess daily energy scheduled by USBR" represent the accumulations of small differences between hourly amounts of energy scheduled for pumping SWP water and those actually used.) Similarly, Table 6A shows the derivation of the SWP

share of energy generated at the San Luis Pumping-Generating Plant.

Energy Sources

Table 6 also shows the monthly sources of SWP energy during 1985. The output of the Hyatt-Thermalito complex in 1985 was 1.72 billion kWh, about 35 percent below last year's output and well below estimated average annual output of 2.38 billion kWh.

Energy generation at the SWP power recovery plants (San Luis, Devil Canyon, Warne, and Castaic) totaled about 1.51 billion kWh, more than double last year's amount. The combined output of the recovery plants and the Hyatt-Thermalito facilities was sufficient to meet about 58 percent of SWP energy requirements in 1985.

Other SWP hydroelectric power resources are obtained under contract with the Kings River Conservation District (KRCD) and MWDSC. The KRCD contract provides DWR with all of the output of the 165-MW Pine Flat Powerplant. The plant furnished 0.34 billion kWh to th SWP in 1985. Under the MWDSC contract DWR receives energy from five small hydroelectric plants on the MWDSC system (30 MW total capacity). As explained in Chapter VI, DWR has exchange agreements with SCE and the Los Angeles Department of Water and Power (LADWP) to facilitate transmission of energy from the MWDSC plants to the SWP.

Under the 1979 DWR-SCE Power Contract, in effect since April 1983, part of the Hyatt-Thermalito generation and all of the output of Devil Canyon Powerplant are delivered to SCE. The energy is generally delivered during on-peak periods and a greater amount of energy is returned during off-peak periods. Table 6 shows both the monthly quantities of energy delivered and returned under this contract. The net gain to the SWP during 1985 was 1.40 billion kWh.

Reid Gardner Unit No. 4 supplied 1.81 billion kWh in 1985, making it the largest single source of SWP energy for

TABLE 6A: RECONCILIATION OF ENERGY USE IN 1985 FOR SWP AND

(in millions of kilowatthours)

ITEM	MONTH						
	JAN	FEB	MARR	APR	MAY	JUN	JUL
Harvey O. Banks Delta Pumping Plant							
Energy Metered at Pumping Plant	35.43	60.61	83.63	58.95	55.11	58.41	84.41
Less Energy Scheduled by USBR for CVP Pumping	−7.27	0.00	−19.36	−2.07	0.00	0.00	−28.97
Plus Excess Daily Energy Scheduled by USBR	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Energy Used for SWP Pumping	28.16	60.61	64.27	56.88	55.11	58.41	55.44
Dos Amigos Pumping Plant							
Energy Metered at Pumping Plant	19.60	39.10	41.49	41.69	52.54	75.21	87.95
Less Energy Scheduled by USBR for CVP Pumping	−6.62	−13.86	−15.21	−15.34	−22.16	−33.25	−38.80
Less Energy Scheduled by USBR for Station Service	−0.03	− 0.03	0.00	0.00	0.00	0.00	0.00
Plus Excess Daily Energy Scheduled by USBR	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Energy Used for SWP Pumping	12.95	25.21	26.28	26.35	30.38	41.96	49.15
San Luis Pumping Plant							
Energy Metered at Pumping Plant	65.23	22.95	21.42	5.73	0.25	0.26	7.77
Less Energy Scheduled by USBR for CVP Pumping	−64.36	−22.31	−20.25	−1.73	0.00	0.00	0.00
Less Energy Scheduled by USBR for Station Service	−0.12	−0.40	−0.25	−0.18	−0.11	−0.08	−0.11
Plus Excess Daily Energy Scheduled by USBR	0.31	0.07	0.30	0.04	0.00	0.00	0.00
Energy Used for SWP Pumping	1.06	0.31	1.22	3.86	0.14	0.18	7.66
Las Perillas Pumping Plant							
Energy Metered at Pumping Plant	0.37	0.56	0.62	1.02	1.43	1.72	1.98
Less Energy Scheduled by USBR for CVP Pumping	−0.07	0.00	0.00	0.00	0.00	0.00	0.00
Energy Used for SWP Pumping	0.30	0.56	0.62	1.02	1.43	1.72	1.98
San Luis Generation Plant							
Energy Metered at Generation Plant	0.00	3.92	1.76	17.43	63.18	95.03	79.37
Less Energy Scheduled by USBR for CVP Use	0.00	−3.96	−1.80	−11.06	−46.33	−59.56	−34.92
Plus Excess Daily Energy Scheduled by USBR	0.00	0.03	0.03	0.04	0.12	0.04	0.00
SWP Share of Energy Generated	0.00	−.01	−.01	6.41	16.97	35.51	44.45

the year. This includes the return of 12 million kWh of energy banked with the Nevada Power Company in 1983 during initial start-up of this coal-fired unit. The balance of the banked energy due DWR was about 30 million kWh as of December 31, 1985.

DWR also has a contract with TERA Power Corporation for the purchase of energy produced at Bethany Wind Park, near the South Bay Pumping Plant. About 145 50-kW wind turbines were operational at the end of 1985; over 12 million kWh of wind-generated energy was delivered to DWR during the year, double last year's output.

Power Purchases and Power Service Costs

Power purchases and transmission service costs during 1985 are summarized in Table 7. DWR purchased 2.87 billion kWh of energy from 13 utilities for $71.5 million. Transmission, capacity, losses, and dispatching services amounted to $38.6 million. Other costs associated with the operation and management of SWP power resources not in Table 7 include:

- o debt service and OM&R costs of $8.4 million associated with the output of Pine Flat Powerplant;
- o OM&R and fuel costs of $49.4 million associated with Reid Gardner Unit No. 4; and
- o debt service and OM&R costs associated with other SWP-owned generation facilities.

Power Sales

When three major long-term power related contracts terminated on March 31, 1983, DWR began operating as a bulk power distributor under new short-term power purchase and sales contracts, and longer term power and transmission contracts with utilities in Arizona, California, Canada, Idaho, Montana, Nevada, Oregon, Texas, and Washington. With the existing SWP resources and new short-term power purchase contracts with the Northwest

CVP PUMPING AT SWP PLANTS AND JOINT-USE FACILITIES

(in millions of kilowatthours)

MONTH						ITEM
AUG	SEP	OCT	NOV	DEC	TOTAL	
						Harvey O. Banks Delta Pumping Plant
100.48	79.17	66.03	62.11	109.02	853.36	Energy Metered at Pumping Plant
-37.27	- 4.45	- 6.32	- 4.66	- 9.34	-119.71	Less Energy Scheduled by USBR for CVP Pumping
0.00	0.00	0.00	0.00	0.00	0.00	Plus Excess Daily Energy Scheduled by USBR
63.21	74.72	59.71	57.45	99.68	733.65	Energy Used for SWP Pumping
						Dos Amigos Pumping Plant
65.83	29.16	22.02	21.07	21.29	516.95	Energy Metered at Pumping Plant
-24.43	- 6.12	- 3.68	- 3.55	- 3.49	-186.51	Less Energy Scheduled by USBR for CVP Pumping
0.00	0.00	0.00	0.00	- 0.16	- 0.22	Less Energy Scheduled by USBR for Station Service
0.00	0.00	0.00	0.00	0.00	0.00	Plus Excess Daily Energy Scheduled by USBR
41.40	23.04	18.34	17.52	17.64	330.22	Energy Used for SWP Pumping
						San Luis Pumping Plant
10.89	44.40	46.94	74.65	144.42	444.91	Energy Metered at Pumping Plant
- 1.53	-24.13	-31.85	-56.03	- 78.50	- 300.69	Less Energy Scheduled by USBR for CVP Pumping
- 0.08	- 0.27	- 0.20	- 0.21	- 0.08	- 2.09	Less Energy Scheduled by USBR for Station Service
0.00	0.04	0.00	0.00	0.00	0.76	Plus Excess Daily Energy Scheduled by USBR
9.28	20.04	14.89	18.41	65.84	142.89	Energy Used for SWP Pumping
						Las Perillas Pumping Plant
1.17	0.42	0.37	0.20	0.30	10.16	Energy Metered at Pumping Plant
-0.07	0.00	0.00	-0.03	0.00	-0.17	Less Energy Scheduled by USBR for CVP Pumping
1.10	0.42	0.37	0.17	0.30	9.99	Energy Used for SWP Pumping
						San Luis Generation Plant
27.73	0.38	0.12	0.80	0.00	289.72	Energy Metered at Generation Plant
- 9.33	0.00	0.00	0.00	0.00	-166.96	Less Energy Scheduled by USBR for CVP Use
0.04	0.00	0.00	0.00	0.00	0.30	Plus Excess Daily Energy Scheduled by USBR
18.44	0.38	0.12	0.80	0.00	123.06	SWP Share of Energy Generated

TABLE 7: SWP POWER AND TRANSMISSION SERVICE PURCHASES IN 1985

Supplier	Services Provided	Invoice Amount
Bonneville Power Authority	Firm and nonfirm energy	$ 10,771,501
British Columbia Hydro Power Authority	Nonfirm energy	2,495,356
El Paso Electric Company	Filing fees	50
Idaho Power Company	Nonfirm energy	197,475
Kings River Conservation District	Hydroelectric energy	2,634,580
Los Angeles Department of Water and Power	Transmission and dispatching	102,336
MCR Geothermal Corporation	Geothermal steam	8,196,173
Montana Power Company	Nonfirm energy	109,030
Nevada Power Company	Transmission	981,478
Pacific Gas and Electric Company, Southern California Edison Company, San Diego Gas and Electric Company	EHV transmission	1,500,000
Pacific Power and Light Company	Firm capacity and energy, transmission and losses on third party systems	20,071,097
Pacific Power and Light Company	Transmission	12,761,125
Portland General Electric Company	Firm capacity, firm and nonfirm energy	24,585,265
Salt River Project Agricultural Improvement and Power District	Energy	353,237
Seattle City Light	Nonfirm energy	97,740
Southern California Edison Company	Transmission and dispatching	13,517,338
TERA Power Corporation	Wind energy	1,130,964
The Metropolitan Water District of Southern California	Hydroelectric energy	9,380,599
Washington Water Power Company	Nonfirm energy	21,944
Western Area Power Administration	Interconnection transmission	1,134,000
Total		$110,041,288

utilities, the SWP is ensured of more than enough energy and capacity to meet future SWP needs. DWR entered into power sales contracts to sell any excess capacity and energy, within the limit of SWP's contractual transmission capabilities, at Malin, Tesla, Vincent, Sylmar, and El Dorado substations.

During 1985, DWR sold this excess capacity and energy on a daily basis to utilities at current market rates. The decision to sell the power, or to wait for a more opportune time, took into consideration projected SWP operations and changes in the power market as well as energy losses, transmission costs, and dispatching costs. DWR's computerized accounting system quickly monitors the status of the power purchases and sales operation.

Table 8 summarizes power related sales by DWR. Total energy sold in 1985 was 3.94 billion kWh for a revenue of $123.1 million from 14 utilities. Other power related revenues were for peaking capacity payments from Nevada Power Company and peaking capacity foregone payments from LADWP for a combined revenue of $3.2 million.

Transmission Service Agreements

The transmission service agreements described in Bulletin 132-84 (page 38) are still in effect. Some contractual options on new interruptible transmission paths between Vincent-San Onofre, Vincent-Sylmar, Vincent-Midway, Vincent-Palo Verde, and El Dorado-Mead were exercised in order to make energy

TABLE 8: SWP POWER SALES IN 1985

Purchaser	Kilowatthours	Amount of Sale
City of Anaheim	188,217,000	$ 5,814,172
City of Burbank	184,034,000	5,732,262
City of Glendale	171,711,000	5,434,480
City of Pasadena	229,278,000	7,279,008
City of Riverside	107,626,000	3,322,937
City of Santa Clara	169,705,000	5,622,305
City of Vernon	87,808,000	2,960,936
Los Angeles Department of Water and Power	38,762,000	3,914,659(a
Nevada Power Company	195,024,000	7,717,142
Northern California Power Agency	183,513,000	6,262,990
Pacific Gas and Electric Company	1,908,078,000	57,199,084
Salt River Project Agricultural Improvement and Power District	31,375,000	899,400
San Diego Gas and Electric Company	174,996,000	6,033,811
Southern California Edison Company	267,197,000	8,125,970
Total	3,937,324,000(b	$126,319,156(b – c

a) Includes $2,727,808 for peaking capacity foregone.
b) In addition to this amount, there was $37,630 in revenue for delivery of 1,174,000 kWh of energy to SCE under the DWR-SCE Generation Replacement Agreement. DWR made this energy delivery to SCE pursuant to the 1982 DWR-San Bernardino Valley Municipal Water District (SBVMWD) Energy Purchase Agreement to replace generation lost by SCE because of water diversions SBVMWD made from the Santa Ana River and Mill Creek.

sales to utilities in Arizona, Nevada, and Southern California.

Because of construction delays, PGandE extended the completion date for the Table Mountain reinforcement project from January 1985 to mid 1986. All equipment has been installed but has not yet been accepted for commercial operation. The delay in increasing the 500-kV transmission capacity from Table Mountain to Tesla substations caused DWR to extend its present transmission contract with the Western Area Power Administration (WAPA). WAPA provides a parallel transmission path from Table Mountain Substation to the Tracy Substation, at which point the transmission path is linked to PGandE's line. Using this parallel transmission path allowed the output from the Hyatt-Thermalito power complex to bypass the power bottleneck between Table Mountain and Tesla substations, resulting in little curtailment of the Hyatt-Thermalito power complex during 1985.